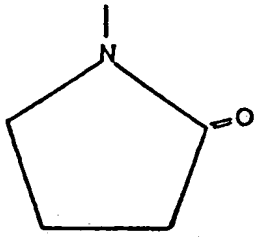
CLAIMS

1. Pharmacologically active compounds of general formula (I)

$$Y\ (W_u, V_z, X_r, A_k) \qquad (I)$$

wherein

Y means the molecular moiety of general formula (Ia), wherein n is an integer from 10 to 400, preferably 20 to 200; one of R_1 and R_2 stands for hydrogen atom whereas the other one means a group of formula (B);



(B)

R_3 means a polymerization-initiating group, preferably $(CH_3)_2CCN$ group;

W means a hydroxyl group, optionally as a salt formed with an alkali metal ion, preferably sodium ion;

V stands for a C1-8, preferably C4-6, alkylamino group bonded through its amino group;

X zis a "spacer" group being an amino acid group or an oligopeptide group of at most six members coupled through its N-terminal to the Y group and optionally bearing a hydroxyl group or a valence bond on its C-terminal, wherein the amino acids are Gly, Ala, Leu, Ile, Val, Phe, Tyr, Ahx, Pro, Arg or His;

A represents a pharmacologically active polypeptide group containing an amino group and directly coupled therethrough to the Y group when r is 0; or coupled to the C-terminal of the X group, respectively, when r is larger than 0;

r is an integer from 0 to 0.2 n;

k k is an integer being at most equal to r; is an integer from 0 to (n-r); and

u is an integer from n to 2n-r-z, as well as the salts and complexes of these compounds.

2. Pharmacologically active compounds of general formula (I) as claimed in claim 1, wherein

A means a pharmacologically active peptide hormone group coupled through its amino group; and k, r, u, z, X, Y, V and W are as defined in claim 1, as well as the salts and complexes of these compounds.

3. Pharmacologically active compounds of general formula (I) as claimed in claim 2, wherein:

A means a native GnRH hormone coupled through its amino group or a pharmacologically active analogue thereof; and
k, r, u, z, X, Y, V and W are as defined in claim 1, as well as the salts and complexes of these compounds.

4. Pharmacologically active compounds of general formula (I) as claimed in claim 3, wherein

A stands for
Glp-His-Trp-Ser-His-Asp-Trp-Lys-Pro-Gly-NH_2,
Ac-D-$Trp^{1,3}$,D-Cpa^2,D-Lys^6,D-Ala^{10}-GnRH
Ac-D-$Trp^{1,3}$,D-Cpa^2,Lys^5,[Asp(a-DEA)]^6,D-Ala^{10}-(Gln^8-GnRH),
D-Phe^2,D-Trp^3,D-Lys^6-GnRH,
Lys^5,cyclo(Asp^6-Lys^8)-GnRH-III,
Lys^4,[Lys(e-Fmoc)]^8-GnRH-III,
Lys^4-GnRH-III,
D-Lys^6-GnRH,
Lys^5,D-Trp^6-GnRH
coupled to X or Y through the e-amino group of their Lys side chains; and k, r, u, z, X, Y, V and W are as defined in claim 1, as well as the salts and complexes of these compounds.

5. Pharmacologically active compounds of general formula (I) as claimed in any of claims 1 to 4, wherein X means an oligopeptide group consisting of four members, preferably -Gly-Phe-Leu-Gly-, and k, r, u, z, A, Y, V and W are as defined in claim 1, as well as the salts and complexes of these compounds.

6. Pharmacologically active compounds of general formula (I) as claimed in any of claims 1 to 4, wherein X means an oligopeptide group consisting of three members, preferably -Phe-Leu-Gly- or -Gly-Leu-Gly-; and k, r, u, z, A, Y, V and W are as defined in claim 1, as well as the salts and complexes of these compounds.

7. Pharmacologically active compounds of general formula (I) as claimed in any of claims 1 to 4, wherein X means an -Ahx- group; and k, r, u, z, A, Y, V and W are as defined in claim 1, as well as the salts and complexes of these compounds.

8. Pharmacologically active compounds of general formula (I) as claimed in any of claims 1 to 4, wherein r is 0; and k, u, z, A, Y, V and W are as defined in claims 1 to 4, as well as the salts and complexes of these compounds.

9. Compounds of general formula (Ic),

$$Y\ [W_u, V'_z, (XOQ)_r] \qquad (Ic)$$

wherein Y means the molecular moiety of general formula (Ia), wherein n is an integer from 10 to 400, preferably 20 to 200; one of R_1 and R_2 stands for hydrogen atom whereas the other one means a group of formula (B); R_3 means a polymerization-initiating group, preferably $(CH_3)_2CCN$ group; W means a hydroxyl group, optionally as a salt formed with an alkali metal ion, preferably sodium ion; V' stands for a C1-8, preferably C4-6, alkylamino group bonded through its amino group; X represents an amino acid group or an oligopeptide group of at most six members coupled through its N-terminal to the Y group; OQ means an activated ester group on C-terminal of the X group, preferably ONp, OPcp, Opfp or ONsu group; r is an integer from 0 to 0.2 n; z is an integer from 0 to (n-r); and u is an integer from n to (2n-r-z), as well as the salts of these compounds.

10. Compounds of general formula (Ic) as claimed in claim 9, wherein X means an oligopeptide group consisting of at most four members, preferably -Gly-Phe-Leu-Gly-, -Gly-Phe-Gly-, -Phe-Leu-Gly- or -Ahx-; OQ stands for ONp group; and k, r, u, z, A, Y, V' as well as W are as defined in claim 9, as well as the salts of these compounds.

11. A pharmaceutical composition, which comprises as active ingredient a novel compound of general formula (I) as claimed in any one of claims 1 to 8, wherein k, r, u, z, X, Y, V and W are as defined in any of claims 1 to 8, or a pharmaceutically acceptable salt or complex thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.

12. A tumour-inhibiting pharmaceutical composition, which comprises a compound of general formula (I) as claimed in claim 3 or claim 4 or a pharmaceutically acceptable salt or complex thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.

13. A tumour-inhibiting and immunostimulatory pharmaceutical composition, which comprises as active ingredient a novel compound of general formula (I), wherein A means Ac-D-$Trp^{1,3}$,D-Cpa^{2},Lys^{5},[Asp(`-DEA)]^{6},D-Ala^{10}-(Gln^{8}-GnRH), and k, r, z, u, X, Y, V and W are as defined in claim 1, or a pharmaceutically acceptable salt or complex thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.

14. Compounds of general formula (IV),

$$X\text{-}R^1\text{-}R^2\text{-}R^3\text{-}R^4\text{-}R^5\text{-}R^6\text{-}R^7\text{-}R^8\text{-Pro-}R^{10}\text{-}Y \qquad (IV)$$

wherein

X means hydrogen, acetyl group or propionyl group when R^1 is different from pGly; or an intramolecular acid amide bond when R^1 stands for pGlu;

R^1 stands for pGlu, Glu, D-Trp, D-Cpa, D-Nal or D-Phe;

R^2 means His, D-Phe or D-Cpa;

R^3 represents D-Cpa, D-Pal or L- or D-Trp optionally protected on the indolyl moiety;

R^4 stands for Ser; or Lys optionally protected on the ε-amino group;

R^5 means Tyr; or Lys optionally protected on the ε-amino group; or His;

R^6 stands for Asp, Glu, D-Lys and optionally ε-amino methylated derivatives thereof; as well as D-Trp, D-Phe, D-Leu, D-Ala, D-Cpa or D-Arg;

R^7 represents Phe, Leu or N-Me-Leu; or L-Trp optionally protected on the indolyl moiety;

R^8 means Lys optionally protected on the ε-amino group; Arg, Gln; or R^6 and R^8 together can form an intramolecular ring through the ε-amino group of Lys when R^6 is Asp and R^8 means Lys;

R^{10} stands for Gly, D-Ala or a valence bond; and

Y represents OH or NH_2 group when R^{10} means Gly or D-Ala; or an ethylamide group when R^{10} means a valence bond, as well as the pharmaceutically acceptable salts and/or esters of these compounds.

15. A compound as claimed in claim 14 selected from the group consisting of:

[Lys(ε-Fmoc)]^5-GnRH-III,

Lys^5-GnRH-III,

Lys^5,cyclo[Asp^6-Lys^8]-GnRH-III,

Lys^5,[Lys(ε-Fmoc)]^8-GnRH-III,

Lys^4,[Lys(ε-Fmoc)]^8-GnRH-III,

Lys^4-GnRH-III,

[Lys(ε-Ac)]^4-GnRH-III,
Glu^6-GnRH-III,
cyclo[Asp^6-Lys^8]-GnRH-III,
D-Ala^{10}-GnRH-III,
H-D-Trp^1, [Lys(ε-Fmoc)]^8, D-Ala^{10}-GnRH-III,
Ac-D-Trp^1, D-Ala^{10}-GnRH-III,
H-D-Trp^1, D-Ala^{10}-GnRH-III,
[Trp(For-Ind)]^{3,7}-GnRH-III,
Phe^7-GnRH-III,
GnRH-III(1-9)-ethylamide,
Lys^5, D-Trp^6-hGnRH,
Lys^4, D-Trp^6-hGnRH,
H-Glu^1, D-Trp^6-hGnRH,
Lys^5, D-Phe^6-hGnRH(1-9)-ethylamide,
Lys^4, D-Phe^6-hGnRH(1-9)-ethylamide,
Lys^5, D-Cpa^6-hGnRH(1-9)-ethylamide; as well as pharmaceutically acceptable salts and esters of these compounds.

16. A pharmaceutical composition, which comprises as active ingredient a novel compoud of general formula (IV), wherein R1-R8, R10, X and Y are as defined in claim 14, or a pharmaceutically acceptable salt or ester thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.

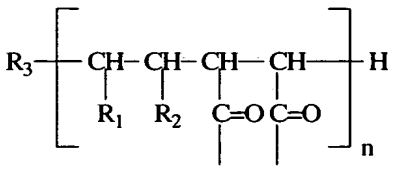
17. A pharmaceutical composition as claimed in claim 16, which comprises as active ingredient a compound according to claim 15 or a pharmaceutically acceptable salt or ester thereof.

18. A pharmacologically active compound of formula (I)

$$Y(W_u,V_z,X_r,A_k) \qquad (I)$$

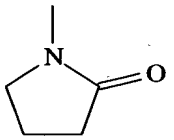
wherein

Y represents the molecular moiety of formula (Ia),



(Ia)

wherein n is an integer from 10 to 400; one of R_1 and R_2 represents hydrogen atom whereas the other one represents a group of formula (B);



(B)

R_3 represents a polymerization-initiating group;

W represents a hydroxyl group, optionally as a salt formed with an alkali metal ion;

V represents a C1-8 alkylamino group bonded through its amino group or a valence bond;

X is a "spacer" group being an amino acid group or an oligopeptide group of at most six members wherein the amino acid or oligopeptide group is coupled through its N-terminal to the Y group and is optionally bearing a hydroxyl group or a valence bond on its C-terminal, wherein the amino acids are Gly, Ala, Leu, Ile, Val, Phe, Tyr, Ahx, Pro, Arg, or His;

A is present and represents a pharmacologically active polypeptide hormone group containing an amino group and directly coupled therethrough to the Y group when r is 0; or coupled to the C-terminal of the X group, respectively, when r is larger than 0;

r is an integer from 0 to 0.2 n;

k is an integer being at most equal to r; z is an integer from 0 to (n-r); and u is an integer from n to 2n-r-z, as well as the salts and complexes of these compounds.

19. The pharmacologically active compound of formula (I) of claim 18, wherein R_3 is a $(CH_3)_2CCN$ group.

20. The pharmacologically active compound of formula (I) of claim 19, wherein:

A represents a native gonadotropin-releasing hormone (GnRH) coupled through its amino group or a pharmacologically active analogue thereof; and k, r, u, z, X, Y, V and W are as defined in claim 18, as well as the salts and complexes of these compounds.

21. The pharmacologically active compound of formula (I) of claim 20, wherein

A represents

pGlu-His-Trp-Ser-His-Asp-Trp-Lys-Pro-Gly-NH_2 (SEQ ID NO:2),

Ac-D-$Trp^{1,3}$, p-chlorophenyl-D-alanine^2(D-Cpa^2),D-Lys^6,D-Ala^{10}-gonadotropin-releasing hormone (GnRH)

Ac-D-$Trp^{1,3}$, D-Cpa^2,Lys^5,[Asp(a-DEA)]^6,D-Ala^{10}-Gln^8-GnRH,

D-Phe^2,D-Trp^3,D-Lys^6-GnRH,

Lys^5,cyclo(Asp^6-Lys^8)-GnRH-III,

Lys^4,[Lys(ε-Fmoc)]^8-GnRH-III,

Lys^4-GnRH-III,

D-Lys^6-GnRH,

Lys^5,D-Trp^6-GnRH

coupled to X or Y through the ε-amino group of their Lys side chains; and k, r, u, z, X, Y, V and W are as defined in claim 18, as well as the salts and complexes of these compounds.

22. The pharmacologically active compound of formula (I) of claim 18, wherein X represents an oligopeptide group consisting of four members; and k, r, u, z, A, Y, V and W are as defined in claim 18, as well as the salts and complexes of these compounds.

23. The pharmacologically active compound of formula (I) of claim 18, wherein X represents an oligopeptide group consisting of three members; and k, r, u, z, A, Y, V and W are as defined in claim 18, as well as the salts and complexes of these compounds.

24. The pharmacologically active compound of formula (I) of claim 18, wherein V is a C4-6 alkylamino group.

25. The pharmacologically active compound of formula (I) of claim 18, wherein r is 0; and k, u, z, A, Y, V and W are as defined in claim 18, as well as the salts and complexes of these compounds.

26. A compound containing an activated ester group of formula (Ic),

$$Y[W_u,V'_z,(XOQ)_r] \qquad \text{(Ic)}$$

wherein Y represents the molecular moiety of formula (Ia), wherein n is an integer from 10 to 400; one of R_1 and R_2 represents hydrogen atom whereas the other one represents a group of formula (B); R_3 represents a polymerization-initiating group; W represents a hydroxyl group, optionally as a salt formed with an alkali metal ion; V' represents a C1-8, alkylamino group bonded through its amino group; X represents an amino acid group or an oligopeptide group of at most six members coupled through its N-terminal to the Y group; OQ represents an activated ester group on C-terminal of the X group; r is an integer from 0 to 0.2 n; z is an integer from 0 to (n-r); and u is an integer from n to (2n-r-z), as well as the salts of these compounds.

27. Compounds of formula (Ic) as claimed in claim 26, wherein X represents an oligopeptide group consisting of at most four members, preferably -Gly-Phe-Leu-Gly-, -Gly-Phe-Gly-, -Phe-Leu- Gly- or -Ahx-; OQ represents ONp group; and k, r, u, z, A, Y, V' as well as W are as defined in claim 26, as well as the salts of these compounds.

28. A pharmaceutical composition comprising a compound of formula (I) of claim 18, wherein k. r, u, z, X, Y, V and W are as defined in claim 18, or a pharmaceutically acceptable salt or complex thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.

29. A tumour-inhibiting pharmaceutical composition comprising a compound of formula (I) of claim 20 or a pharmaceutically acceptable salt or complex thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.

30. A tumour-inhibiting and immunostimulatory pharmaceutical composition comprising a compound of formula (I), wherein A represents Ac-D-$Trp^{1,3}$, p-chlorophenyl-D-$alanine^{2}$(D-Cpa^{2}),Lys^{5},[Asp(a-DEA)]^{6},D-Ala^{10}-Gln^{8}-GnRH, and k, r, z, u, X, Y, V and W are as defined in claim 18, or a pharmaceutically acceptable salt or complex thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.

31. A compound of formula (IV),

$$X\text{-}R^{1}\text{-}R^{2}\text{-}R^{3}\text{-}R^{4}\text{-}R^{5}\text{-}R^{6}\text{-}R^{7}\text{-}R^{8}\text{-Pro-}R^{10}\text{-}Y \qquad (IV)$$

wherein

X represents hydrogen, acetyl group or propionyl group when R^{1} is different from pGlu; or X is not present when R^{1} represents pGlu;

R^{1} represents pGlu, Glu, D-Trp, p-chlorophenyl-D-alanine(D-Cpa), D-Nal or D-Phe;

R^{2} represents His, D-Phe, or D-Cpa;

R^3 represents D-Cpa, β-(3-pyridyl)-D-alanine(D-Pal) or L- or D-Trp optionally protected on the indolyl moiety;

R^4 represents Ser; or Lys optionally protected on the ε-amino group;

R^5 represents Tyr; or Lys optionally protected on the ε-amino group; or His;

R^6 represents Asp, Glu, D-Lys and optionally ε-amino methylated derivatives thereof; as well as D-Trp, D-Phe, D-Leu, D-Ala, D-Cpa or D-Arg;

R^7 represents Phe, Leu or N-Me-Leu; or L-Trp optionally protected on the indolyl moiety;

R^8 represents Lys optionally protected on the ε-amino group; Arg, Gln; or R^6 and R^8 together can form an intramolecular ring through the ε-amino group of Lys when R^6 is Asp and R^8 represents Lys;

R^{10} represents Gly, D-Ala or a valence bond; and

Y represents OH or NH_2 when R^{10} is Gly or D-Ala; or an ethylamide group when R^{10} is a valence bond; or a pharmaceutically acceptable salt or ester thereof.

31. A composition comprising a compound of claim 18 in combination with a pharmaceutically acceptable carrier.

32. The pharmacologically active compound of claim 18, wherein n is an integer from 20 to 200.

33. The pharmacologically active compound of claim 22, wherein X represents -Gly-Phe-Leu-Gly- (SEQ ID NO:5).

34. The pharmacologically active compound of claim 23, wherein X represents -Phe-Leu-Gly-.

35. The pharmacologically active compound of claim 23, wherein X represents -Gly-Leu-Gly-.

36. The compound of claim 26, wherein n is an integer from 20 to 200.

37. The compound of claim 26, wherein R_3 represents $(CH_3)_2CCN$.

38. The compound of claim 26, wherein W represents a hydroxyl grop as a salt formed with a sodium ion.

39. The compound of claim 26, wherein V' represents a C4-6 alkylamino group.

40. The compound of claim 26, wherein the activated ester group is selected from the group consisting of ONp, OPcp, Opfp, and ONsu.

41. A tumour-inhibiting pharmaceutical composition comprising a compound of formula (I) of claim 21 or a pharmaceutically acceptable salt or complex thereof in admixture with carriers and/or additives commonly used in the pharmaceutical industry.